

Numerical Scheme for the Generalised Serre-Green-Naghdi Model

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In this paper the authors present a numerical scheme for solving the generalised Serre-Green-Naghdi equations (gSGNE) by Clamond and Dutykh. The scheme is based on a two-step algorithm where an elliptic problem is solved followed by a finite volume step based on a Central-Upwind scheme. Some numerical simulations are then presented to validate the approach.

The focus and novelty of the paper is this paper is then the numerical approach of the gSGNE system. Although this type of applications is of interest, I do not think that this work is adapted to the standar quality levels of APNUM.

First, the model and applications proposed here concerns the constant bottom topography case. As such, the system is written under the form of a system of conservation laws which simplifies its numerical treatment. The counterpart is that the range of validity for such models and its applications ir rather limited. Most case scenarios need a non-constant topography.

Second, the numerical simulations shown are quite simple. They correspond mainly to propagation of solitons. These type of applications are a first step to validate model and numerical approach, as they allow a comparison with analytical solutions. Nevertheless, they are not sufficient and a real validation needs comparison with real and laboratory examples. If the objective of the paper is to present a numerical scheme, then it must be shown that the numerical approach is valid in many different scenarios. This should include more complex and challenging test cases. See for instance the usual benchmarks used for similar applications.

Finally, the numerical strategy proposed here is not necessarily new. This approach based on a finite volume method followed by an elliptic problem can be found for different dispersive systems. It is true that they are applied to other systems different from sGNE, but the initial idea is not so far.

Therefore, I cannot recommend the paper for its publication in APNUM and I suggest the authors to try a lower level journal and to address my previous comments when possible.